AMENDMENTS TO THE CLAIMS:

This listing of claims will replace prior versions and listings of claims in the application:

Listing of claims:

1. (Cancelled)

2. (Currently amended) The compact thrust load enhancement device according to ~~claim 1~~ claim 13, wherein the external force F_{ext} is caused by an action selected from the group consisting of pressure and gravity in a vertical shaft configuration wherein a center of gravity is low.

3. (Currently amended) The compact thrust load enhancement device according to ~~claim 1~~ claim 13, wherein said at least one permanent magnet is fixed to said stator; said at least one permanent magnet being separated from said rotor by said magnetic air gap.

4. (Withdrawn- currently amended) The compact thrust load enhancement device according to ~~claim 1~~ claim 13, wherein said at least one permanent magnet is fixed to said rotor, said at least one permanent magnet being separated from said stator by said magnetic air gap.

5. (Withdrawn- currently amended) The compact thrust load enhancement device according to ~~claim 1~~ claim 13, wherein a first one of said at least one permanent magnet is fixed to said stator and a second one of said at least one permanent magnet is fixed to said rotor, the magnetic air gap separating said first permanent magnet from said rotor and said second permanent magnet from said rotor respectively.

6. (Withdrawn- currently amended) The compact thrust load enhancement device according to claim 5, wherein said first one of said at least one permanent magnet and said second one of said at least one permanent magnet respectively have poles of different polarity facing each other to create an attractive compensation force between said rotor and said stator.

7. (Withdrawn- currently amended) The compact thrust load enhancement device according to claim 5, wherein said first one of said at least one permanent magnet and said second one of said at least one permanent magnet respectively have poles of a similar polarity facing each other to create an expulsion compensation force between said rotor and said stator.

8. (Currently amended) The compact thrust load enhancement device according to ~~claim 1~~ claim 13, further comprising a spacer to adjust said magnetic air gap.

9. (Currently amended)The compact thrust load enhancement device according to ~~claim 1~~ claim 13, further comprising a piezoelectric actuator mounted in said stator.

10. (Withdrawn- currently amended) The compact thrust load enhancement device according to claim 5, wherein said rotor and said stator are made in a material selected from the group consisting of a soft magnetic material and a non-magnetic material.

11. (Currently amended) The compact thrust load enhancement device according to ~~claim 1~~ claim 13, wherein said rotor is made of carbon steel and said stator is made of mild steel.

12. (Currently amended) The compact thrust load enhancement device according to ~~claim 1~~ claim 13, wherein the external force is selected in the group consisting of a static force and a dynamic force.

13. (Currently amended) ~~The~~ A compact thrust load enhancement device for a rotor-bearing system ~~according to claim 1~~, ~~further~~ comprising:

a stator mounted on a rotation axis of the rotor-bearing system;

a rotor mounted on the rotation axis of the rotor-bearing system and separated from said stator by a magnetic air gap on the rotation axis;

at least one permanent magnet mounted on the rotation axis of the rotor-bearing system; said at least one permanent magnet being fixed to a first one of: i) said stator and ii) said rotor, and being separated from a second one of: i) said stator and ii) said rotor by said magnetic air gap;

wherein the rotor length needs not be modified to accommodate said thrust load enhancement device, and a minimum volume of magnet is used; said at least one permanent magnet, said stator, said rotor and said magnetic air gap forming a magnetic circuit generating a compensation force between said rotor and said stator that opposes an external force F_{ext}, said compensation force being either attractive or repulsive depending on said external force F_{ext}; *and*

force measurement devices to measure the compensation force.

14. (Currently amended) The compact thrust load enhancement device according to ~~claim 1~~ claim 13, wherein said force measurement devices are selected from the group consisting of strain gauges and piezoelectric elements.

15. (Currently amended) The compact thrust load enhancement device according to ~~claim 1~~ claim 13, wherein said load enhancement device is located at one end of a shaft of the rotor-bearing system.

16. (Currently amended) The compact thrust load enhancement device according to ~~claim 1~~ claim 13, wherein the thrust load is unidirectional from an external working load.

17. (Currently amended) The compact thrust load enhancement device according to ~~claim 1~~ claim 13, wherein the thrust load is unidirectional from a rotor weight in a vertical configuration.

18. (Currently amended) The compact thrust load enhancement device according to ~~claim 1~~ claim 13, wherein the external force is an unidirectional external static load selected in the group consisting of a working load and a shaft weight in a vertical configuration.

19. (Currently amended) The compact thrust load enhancement device according to ~~claim 1~~ claim 13, wherein the rotor-bearing system is selected from the group consisting of a magnetic bearing system, a hydrostatic bearing system, a hydrodynamic bearing system, and a rolling element bearing system.

20. (Cancelled)

21. (Previously presented) The method for thrust load enhancement according to claim 25, wherein said steps of providing a stator and said step of providing a rotor comprise providing a rotor and a stator made in a material selected from the group consisting of a soft magnetic material and a non-magnetic material.

22. (Currently amended) The method for thrust load enhancement according to claim 31 ~~claim 20~~, wherein said step of providing a stator comprises providing a stator made of mild steel and said step of providing a rotor comprises providing a rotor made of carbon steel.

23. (Currently amended) The method for thrust load enhancement according to claim 31 ~~claim 20~~, wherein said step of providing at least one permanent magnet comprises mounting at least one permanent magnet on the stator, the magnetic air gap separating the at least one permanent magnet from the rotor.

24. (Withdrawn- currently amended) The method for thrust load enhancement according to claim 31 ~~claim 20~~, wherein said step of providing at least one permanent magnet comprises mounting at least one permanent magnet on the rotor, the magnetic air gap separating the at least one permanent magnet from the stator.

25. (Withdrawn- currently amended) The method for thrust load enhancement according to claim 31 ~~claim 20~~, wherein said step of providing at least one permanent magnet comprises fixing a first permanent magnet to the stator and a second permanent magnet to the rotor, the magnetic air gap separating the first permanent magnet from the rotor and the second permanent magnet from the stator.

26. (Previously presented) The method for thrust load enhancement according to claim 25, wherein said steps of fixing a first permanent magnet to the stator and a second permanent magnet to the rotor comprise arranging respective poles of different polarity thereof facing each other to create an attractive compensation force between the rotor and the stator.

27. (Previously presented) The method for thrust load enhancement according to claim 25, wherein said steps of fixing a first permanent magnet to the stator and a second permanent magnet to the rotor comprises arranging respective poles of similar polarity facing each other to create an expulsion compensation force between the rotor and the stator.

28. (Currently amended) The method for thrust load enhancement according to claim 31 ~~claim 20~~, further comprising a step of providing a spacer to adjust said magnetic air gap.

29. (Currently amended) The method for thrust load enhancement according to claim 31 ~~claim 20~~, further comprising the step of mounting a piezoelectric actuator in the stator.

30. (Currently amended) The method for thrust load enhancement according to claim 31 ~~claim 20~~, wherein the external force is selected from the group consisting of a static force and a dynamic force.

31. (Currently amended) ~~The~~ A method for thrust load enhancement for a high-speed rotor-bearing system ~~according to claim 20~~, ~~further~~ comprising the steps of :

providing a stator on a rotation axis of the rotor-bearing system;

providing a rotor of an outer diameter similar to that of the bearing system on the rotation axis of the rotor-bearing system separated on the rotation axis from the stator by a magnetic air gap;

providing at least one permanent magnet on the rotation axis separated from a first one of: i) the stator and ii) the rotor, the at least one permanent magnet being separated from a second one of: i) the stator and ii) the rotor by the magnetic air gap;

whereby the length of the rotor need not be modified during the above steps; and

whereby the at least one permanent magnet, the stator, the rotor and the magnetic air gap form a magnetic circuit that generates a compensation force between the rotor and the stator, said compensation force being attractive or repulsive to oppose an external force F_{ext} depending on the external force F_{ext}; and

providing force measurement devices to measure the compensation force.

32. (Previously presented) The method for thrust load enhancement according to claim 31, wherein said step of providing force measurement devices comprises selecting devices from the group consisting of strain gauges and piezoelectric elements.

33. (Currently amended) The method for thrust load enhancement according to claim 31 ~~claim 20~~, wherein the rotor-bearing system is selected from the group consisting of a magnetic bearing system, a hydrostatic bearing system, a hydrodynamic bearing system, and a rolling element bearing system.